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Air Operating Permit Excess Emissions Report Form Part II

Name of Facility	Shell, Puget Sound Refinery	Reported by	Tim Figgie
Date of notification	Jan 9, 2014	Incident type: breakdown/ upset/startup or shutdown	Upset
Start Date	Jan 8, 2014	Start Time:	10:45 PM
End Date	Jan 9, 2014	End Time:	1:00 AM
Process unit or system(s): HTU2			

Incident Description

On January 8 at approximately 10:45 PM the HTU 2 fuel gas system H₂S reading went high. The high H₂S reading occurred when the diethanolamine (DEA) in the Flare Gas Recovery (FGR) unit Absorber became contaminated with hydrocarbon (primarily butanes). The hydrocarbon originated from the Alky 1 refrigerant section that had a charge pump out for maintenance and from the RP&S butane compressor that was not operating properly resulting in liquids going to the flare. The combination of having these 2 sources of hydrocarbon overwhelmed the FGR hydrocarbon return line (routes liquids to the FCCU recovery section), which resulted in excess hydrocarbon flowing to the FGR Absorber. The DEA circulation was eventually stopped so that Operations could skim off the hydrocarbon that had built up in the FGR Absorber. The H₂S readings dropped once the hydrocarbon material was removed and DEA circulation was reestablished. This event resulted in 2 periods above the 162ppm 3-hr rolling average limit.

The FGR absorber overhead gas flows to the main plant mix drum and the HTU2 fuel gas line takes suction off that same line prior to reaching the plant mix drum. This allowed HTU2 to pull the sour FGR absorber gas to its mix drum before a large volume of sour gas got to the main plant mix drum. The plant mix drum did see a short term spike in H₂S but there was not a H₂S exceedance in the plant fuel gas system.

Immediate steps taken to limit the duration and/or quantity of excess emissions:

Operations immediately began troubleshooting the problem.

Applicable air operating permit term(s): 5.7.7 and 5.7.11

Estimated Excess Emissions: Based on online H ₂ S CEMS and fuel gas flow meters	Pollutant(s): SO ₂	Pounds (Estimate): 2.5
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The incident was the result of the following (check all that apply):

- ☐ Scheduled equipment startup
- ☐ Scheduled equipment shutdown
- ☐ Poor or inadequate design
- ☐ Careless, poor, or inadequate operation
- ☐ Poor or inadequate maintenance
- ☒ A reasonably preventable condition

PSR0000623

Did the facility receive any complaints from the public?

- ☒ No
☐ Yes (provide details below)

Did the incident result in the violation of an ambient air quality standard

- ☒ No
☐ Yes (provide details below)

Root and other contributing causes of incident:

The root cause of this event was high flow of hydrocarbon to the flare FGR system. A contributing factor was that the automated control loop on the FGR absorber slowed down amine flow when the level increased due to the excess hydrocarbon. The reduce amine flow caused the amine in the absorber to become saturated with H₂S, which reduced the ability of the amine to remove H₂S from the recovered fuel gas.

The root cause of the incident was:

(The retention of records of all required monitoring data and support information shall be kept for a period of five years from the date of the report as per the WAC regulation (173-401-615))

- ☒ Identified for the first time
☐ Identified as a recurrence (explain previous incident(s) below – provide dates)

Are the emissions from the incident exempted by the NSPS or NESHAP "malfunction" definitions below?

- ☒ No
☐ Yes (describe below)

Definition of NSPS "Malfunction": Any sudden, infrequent, and not reasonably preventable failure of air pollution control equipment, process equipment, or failure of a process to operate in a normal or usual manner. Failures that are caused in part by poor maintenance or careless operation are not malfunctions. 40 CFR 60.2

Definition of NESHAP "Malfunction": Any sudden, infrequent, and not reasonably preventable failure of air pollution control and monitoring equipment, process equipment, or a process to operate in a normal or usual manner which causes, or has the potential to cause, the emission limitations in an applicable standard to be exceeded. Failures that are caused in part by poor maintenance or careless operation are not malfunctions. 40 CFR 63.2

Analyses of measures available to reduce likelihood of recurrence (evaluate possible design, operational, and maintenance changes; discuss alternatives, probable effectiveness, and cost; determine if an outside consultant should be retained to assist with analyses):

To prevent a reoccurrence of this event, the computer control system was changed to make it easier for the Operator to perform skimming hydrocarbon from the absorber and to keep the amine circulation at the normal rates.

Description of corrective action to be taken (include commencement and completion dates):

See above

If correction not required, explain basis for conclusion:

See above

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Attach Reports, Reference Documents, and Other Backup Material as Necessary. This report satisfies the requirements of both NWCAA regulation 340, 341, 342 and the WAC regulation (173-400-107).

Is the investigation continuing? ☒ No ☐ Yes

Is the source requesting additional time for completion of the report? ☒ No ☐ Yes

Based upon information and belief formed after reasonable inquiry, I certify that the statements and information in this document and all referenced documents and attachments are true, accurate and complete.

Prepared By: Mike Osborne

Date: Jan 28, 2013

Responsible Official or Designee: 

Date: 25-02-2014